METASYS®

*APPLICATION NOTE*

# Metasys Integrator® MGE UPS Systems Application

# Introduction

This document explains the Metasys Integrator® MGE UPS Systems application. Use this document with the Metasys Integrator technical bulletins in the *Metasys Connectivity Technical Manual (FAN 629.5)*, which provide information on installing and commissioning the Metasys Integrator unit. For information pertaining to MGE UPS Systems equipment, see applicable MGE UPS Systems documentation (obtainable from your MGE UPS service representative).

## *Application Details*

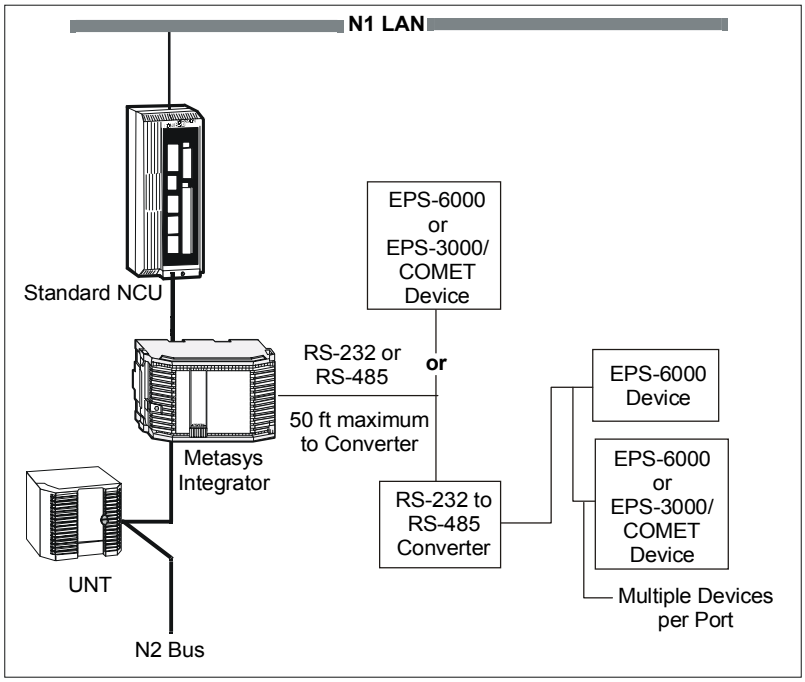
The Metasys Integrator unit allows MGE UPS Systems equipment to become an integral part of the Metasys® and Metasys Companion™ Networks. Once an EPS-6000 or an EPS-3000/COMET is connected to Metasys or Companion Networks via the Metasys Integrator unit, their data is available to the full complement of Metasys Building Automation System (BAS) features, including Change-of-State (COS) monitoring, alarm notification, scheduling, trend, and totalization.

Up to 28 EPS-6000 or 255 EPS-3000/COMET devices can be connected to each vendor port of the Metasys Integrator unit, for a total of 56 EPS-6000 or 510 EPS-3000/COMET Uninterruptible Power Supplies (UPSs) on a two-port Metasys Integrator unit. Scan time may be unacceptable if the maximum number of devices is defined.

Figure 1 shows MGE UPS Systems and Metasys integration. Figure 2 shows MGE UPS Systems and Metasys Companion integration.

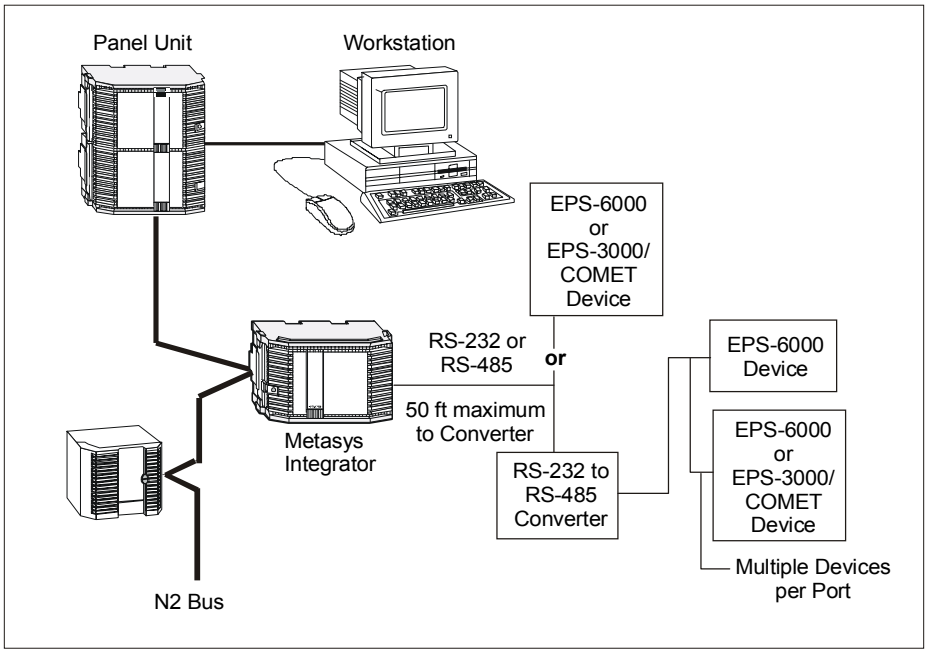
The Metasys Integrator unit supports the following MGE UPS Systems devices:

- EPS-6000 Unitary UPS
- EPS-6000 Parallel UPS
- EPS-6000 Static Switch Cabinet
- EPS-3000/COMET UPS




Note: If you use a UPM enclosure, you **must** install the Metasys Integrator 300 Series in a two high enclosure (EN-EWC25-0) rather than a one high enclosure (EN-EWC13-0) as shown in the figures in this application note.

**Figure 1: MGE UPS Systems and Metasys Integration**




Note: If you use a UPM enclosure, you **must** install the Metasys Integrator 300 Series in a two high enclosure (EN-EWC25-0) rather than a one high enclosure (EN-EWC13-0) as shown in the figures in this application note.

**Figure 2: MGE UPS Systems and Metasys Companion Integration**

## *Component Requirements*

To integrate MGE UPS Systems, you need the following:

- properly installed MGE UPS Systems with appropriate Communication Interface Option (RS-232 or RS-485)
- B&B RS-232 to RS-485 converter (485 TBLED) with power supply (if necessary)
- cables and connectors for connecting the converter to MGE UPS Systems
- Metasys Integrator unit
- N2 Bus (for connecting the Metasys Integrator unit to the Metasys or Companion Network)
- portable PC for downloading vendor communication tables (.VCT files) and network setup information, and for running diagnostics
- cable for connecting portable PC to the Metasys Integrator unit
- the correct vendor communication table (.VCT file) to download into the Metasys Integrator unit (supplied on CD-ROM)
- already installed communication trunk (RS-485) for the MGE UPS Systems equipment

This document describes the RS-232 cable and the vendor communication tables. MGE UPS Systems documentation describes their equipment. The remaining components are described in the Metasys Integrator technical bulletins.

### Metasys Release Requirements

To integrate MGE UPS Systems equipment into the Metasys Network, you need:

- Metasys OWS software Release 9.0 or higher
- Metasys Integrator software/firmware Release 9.0 or higher

### Metasys Companion Release Requirements

To integrate MGE UPS Systems equipment into the Metasys Companion Network, you need:

- Metasys Companion Release 7.0 or higher
- Metasys Integrator software/firmware Release 9.0 or higher

## Vendor Component Requirements

Integration between the Metasys Integrator unit and MGE UPS Systems has been tested with the equipment listed in Table 1. Changes to this equipment or integration of MGE UPS Systems products not discussed in this document require additional software development and testing by Johnson Controls Systems Products. For information on integrating other products, refer to the *Custom Integration* section in this document.

**Table 1: MGE UPS Systems Part and Software Version Numbers**

| MGE Product | Firmware Version |
|---|---|
| **EPS-6000** | PAJO Board, Rev. C1 and C3<br>Acq EPROM, Rev. G0 and H0<br>Com EPROM, Rev. J0 |
| **EPS-3000/COMET** | PAJO Board, Rev. C0<br>Acq Firmware, Rev. B3 and B5 |

## *Vendor Contact Information*

MGE UPS Systems, Inc.
1660 Scenic Avenue
Costa Mesa, CA 92626

Technical Support:
Phone: (800) 438-7373
FAX: (714) 434-7645
Internet: http://www.mgeups.com

B&B Electronics Manufacturing Company
707 Dayton Road
P.O. Box 1040
Ottawa, IL 61350

Phone: (815) 433-5100
FAX: (815) 433-5104

The following documentation is available from your MGE UPS Systems representative:

- All EPS-6000 products:
  - *GTC Link Communications Interface User Manual*
- All EPS-3000/COMET products:
  - *Comet J-BUS Communications System*

## *Design Considerations*

When integrating MGE UPS Systems equipment, consider the following:

- All MGE UPS Systems equipment must be set up and running properly **before** attempting to integrate with Metasys or Companion Networks. (The MGE UPS Systems representative is responsible for configuration of MGE UPS Systems equipment.)
- Make sure each UPS baud rate is set to 9600. (The MGE UPS Systems representative is responsible for setting the baud rate.)
- Each UPS must have a valid address and the address for each UPS is a unique communication address. Do not use Address 0.
- RS-232 cable distance between the Metasys Integrator unit and the RS-232 to RS-485 converter can be a maximum of 50 feet.
- Cable distance between the converter and the last UPS can be a maximum of 4000 feet.
- The appropriate communication option package must be present in UPS equipment. Verify the installation of this option with your local MGE UPS Systems representative.

# Cable Connections

## *Cable Pinouts*

When connecting to an RS-485 converter, use the following cable pinouts for the Metasys Integrator unit to the converter:

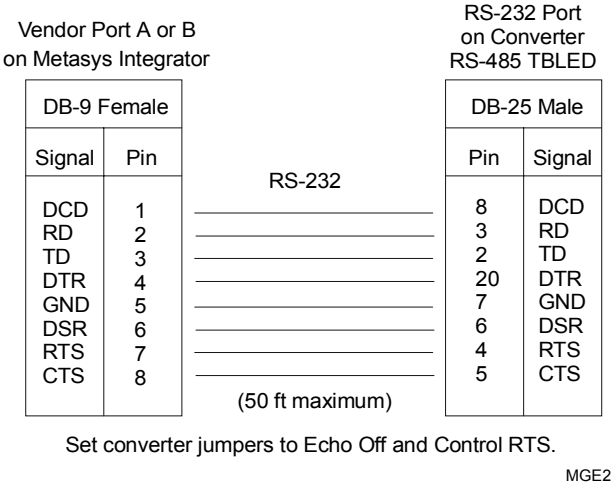



**Figure 3: Metasys Integrator to Converter**

## EPS-3000/COMET Pinouts

Use the following pinouts for the EPS-3000/COMET:

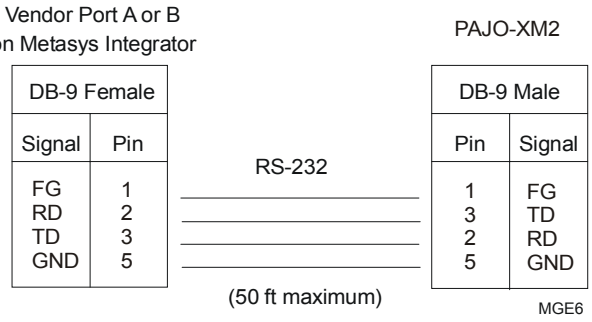



**Figure 4: Metasys Integrator to EPS-3000/COMET Using RS-232**

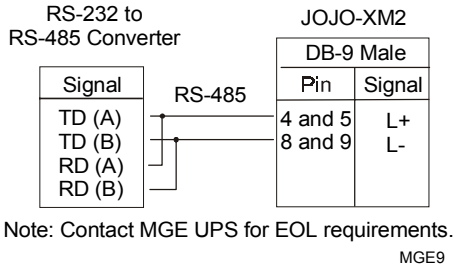



**Figure 5: Converter to EPS-3000/COMET Using Two Wires**

## EPS-6000 Pinouts

Use the following pinouts for the EPS-6000:

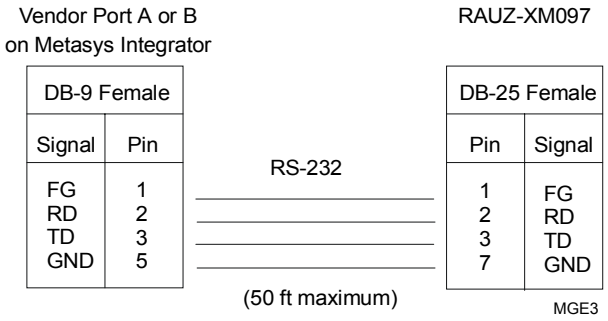



**Figure 6: Metasys Integrator Unit to EPS-6000 Using RS-232**

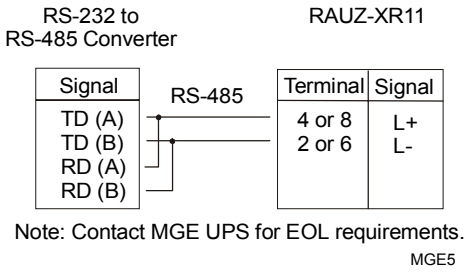



**Figure 7: Converter to EPS-6000 Using Two Wires**

### *Connecting the Cable*

Connect the female end of the RS-232 cable to either Vendor Port A or Vendor Port B on the Metasys Integrator unit. Connect the other end to the RS-232 port on the MGE UPS Systems equipment or connect the other end to the RS-232 to RS-485 converter.

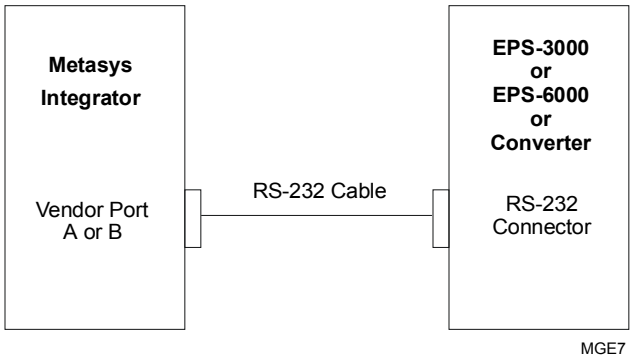



**Figure 8: Port-to-Port Connection**

# Metasys Integrator Setup

To set up the Metasys Integrator unit, use a portable PC connected to Metasys Integrator Terminal Port. Metasys Integrator setup involves:

- downloading the correct vendor communication table (.VCT file)
- setting up the ports
- setting up the network addressing

It is necessary to download a .VCT file only once, even if more than one device is referencing the file.

The following table provides information specific to the MGE UPS Systems applications. For detailed procedures, see the Metasys Integrator technical bulletins.

**Table 2: Metasys Integrator Setup for MGE UPS Systems**

| | |
|---|---|
| **Vendor Communication Table (.VCT File)** | |
| **Unitary, Parallel, and Static Switch** | MGEUPS.VCT |
| **Comet** | MGECOMET.VCT |
| **Port Setup** | |
| **Baud Rate** | 9600 |
| **Word Length** | 8 |
| **Stop Bits** | 1 |
| **Parity** | None |
| **Interface** | RS-232 or RS-485 (If using RS-485, refer to the *Cable Connections* section of this document.) |
| **Network Setup** | |
| **Vendor Address**<br>**EPS-6000**<br>**EPS-3000/COMET** | <br>20, 28, 30 . . . F0, F8 (hex value only)<br>1-FF (hex) |
| **Timeout Value** | 1000 ms |
| **Poll Delay** | 55 ms |
| **Performance Guide** | |
| **Approximate Scan Time**<br>(For a single N2 address) | <br>2 seconds |

# Point Mapping Tables

### *Unitary, Parallel, and Static Switch Devices*

*To get the hardware reference for mapping points to a CS object (via the software model), combine the NPT (Network Point Type) and NPA (Network Point Address). For example, the hardware reference for the Current Phase 3 Mains 1 point is AI3.*

Table 3 shows the points available for mapping in the Unitary, Parallel, and Static Switch devices.

**Table 3: Unitary, Parallel, and Static Switch Devices**

| NPT[1] | NPA[2] | Unit | Description |
|---|---|---|---|
| **AI** | 1 | A | Current Phase 1 Mains 1[5] |
| **AI** | 2 | A | Current Phase 2 Mains 1[5] |
| **AI** | 3 | A | Current Phase 3 Mains 1[5] |
| **AI** | 4 | A | Current Phase 1 Invert[5] |
| **AI** | 5 | A | Current Phase 2 Invert[5] |
| **AI** | 6 | A | Current Phase 3 Invert[5] |
| **AI** | 7 | A | Current Phase 1 Mains 2[4] |
| **AI** | 8 | A | Current Phase 2 Mains 2[4] |
| **AI** | 9 | A | Current Phase 3 Mains 2[4] |
| **AI** | 10 | A | Current Phase 1 Load |
| **AI** | 11 | A | Current Phase 2 Load |
| **AI** | 12 | A | Current Phase 3 Load |
| **AI** | 13 | A | Current Battery (if battery is installed)[5] |
| **AI** | 14 | | % Load |
| **AI** | 15 | | % Peak Load Phase 1 |
| **AI** | 16 | | % Peak Load Phase 2 |
| **AI** | 17 | | % Peak Load Phase 3 |
| **AI** | 18 | V | U12 Volt Mains 1[4] |
| **AI** | 19 | V | U23 Volt Mains 1[4] |
| **AI** | 20 | V | U31 Volt Mains 1[4] |
| **AI** | 21 | V | U1N Inverter Volt[5] |
| **AI** | 22 | V | U2N Inverter Volt[5] |
| **AI** | 23 | V | U3N Inverter Volt[5] |
| **AI** | 24 | V | U12 Inverter Volt[5] |
| **AI** | 25 | V | U23 Inverter Volt[5] |
| **AI** | 26 | V | U31 Inverter Volt[5] |
| **AI** | 27 | V | U1N Volt Main 2[4] |
| **AI** | 28 | V | U2N Volt Main 2[4] |
| **AI** | 29 | V | U3N Volt Mains 2[4] |
| **AI** | 30 | V | U12 Volt Mains 2[4] |
| **AI** | 31 | V | U23 Volt Mains 2[4] |
| **AI** | 32 | V | U31 Volt Mains 2[4] |
| **AI** | 33 | V | U1N Load Voltage |
| **AI** | 34 | V | U2N Load Voltage |

1 Network Point Type
2 Network Point Address
4 Not available for Parallel UPS.
5 Not available for Static Switch UPS.

**Continued on next page . . .**

| NPT[1] (Cont.) | NPA [2] | Unit | Description |
|---|---|---|---|
| **AI** | 35 | V | U3N Load Voltage |
| **AI** | 36 | V | U12 Load Voltage |
| **AI** | 37 | V | U23 Load Voltage |
| **AI** | 38 | V | U31 Load Voltage |
| **AI** | 39 | V | U Battery Voltage[5] |
| **AI** | 40 | Hz | Frequency Mains 1[5] |
| **AI** | 41 | Hz | Frequency Inverter[5] |
| **AI** | 42 | Hz | Frequency Mains 2[4] |
| **AI** | 43 | Hz | Frequency Load |
| **AI** | 44 | V | U Battery Voltage[5] |
| **AI** | 45 | A | I Battery Current[5] |
| **AI** | 46 | Min | Battery Backup Time (if installed)[5] |
| **AI** | 47 | DegC | Battery Room Temperature Deg C[3] (if installed)[5] |
| **AI** | 48 | DegF | Battery Room Temperature Deg F[3] (if installed)[5] |
| **AI** | 49 | A | Current Rated Load |
| **AI** | 50 | kW | Power Rated Load |
| **AI** | 51 | kW | P1 (Load Active) |
| **AI** | 52 | kW | P2 (Load Active) |
| **AI** | 53 | kW | P3 (Load Active) |
| **AI** | 54 | kVA | S1 (Load Active) |
| **AI** | 55 | kVA | S2 (Load Active) |
| **AI** | 56 | kVA | S3 (Load Active) |
| **AI** | 57 | kW | P (Load Active) |
| **AI** | 58 | kVA | S1 (Load Apparent) |
| **AI** | 59 | | % Inverter Load |
| **AI** | 60 | | Power Factor |
| **AI** | 61 | DegF | Battery Room Temperature |

1 Network Point Type

2 Network Point Address

3 Duplicate points are shown in different units. This allows the Metasys Network to use either set of units.

4 Not available for Parallel UPS.

5 Not available for Static Switch UPS.

**Continued on next page . . .**

| NPT[1] (Cont.) | NPA[2] | Unit | Description | | |
|---|---|---|---|---|---|
| **BI** | 1 | | Batt Circuit Brkr[5] | 0-open | 1-closed |
| **BI** | 2 | | Batt Discharging[5] | 0-no | 1-yes |
| **BI** | 3 | | Minimum Battery Volt[5] | 0-no | 1-yes |
| **BI** | 4 | | Low Batt Shutdown[5] | 0-no | 1-yes |
| **BI** | 5 | | Batt High Temperature[5] | 0-normal | 1-alarm |
| **BI** | 6 | | Mains 1 Voltage[5] | 0-normal | 1-alarm |
| **BI** | 7 | | Batt Room Ventilate[5] | 0-normal | 1-alarm |
| **BI** | 8 | | Battery Charging[5] | 0-no | 1-yes |
| **BI** | 9 | | Rect Charger Status[5] | 0-off | 1-on |
| **BI** | 10 | | Major Rect-Chrg Fit[5] | 0-normal | 1-alarm |
| **BI** | 11 | | Mains 1 Input Sw[5] | 0-open | 1-closed |
| **BI** | 12 | | Emergency Off Sw[6] | 0-inactive | 1-active |
| **BI** | 13 | | Rect-Chgr Input Volt[5] | 0-normal | 1-alarm |
| **BI** | 14 | | Rect-Chgr Input Freq[5] | 0-normal | 1-alarm |
| **BI** | 15 | | Grad Rect-Chgr Shut (if battery installed)[5] | 0-inactive | 1-active |
| **BI** | 16 | | EngGenSet Curr Lim (if battery installed)[5] | 0-inactive | 1-active |
| **BI** | 17 | | Batt Current Limit (if battery installed)[5] | 0-inactive | 1-active |
| **BI** | 18 | | Battery Equalization (if battery installed)[5] | 0-inactive | 1-active |
| **BI** | 19 | | Operation on Engine[5] | 0-inactive | 1-active |
| **BI** | 20 | | System Normal | 0-no | 1-yes |
| **BI** | 21 | | Unsafe Operation | 0-safe | 1-unsafe |
| **BI** | 22 | | System Downgraded | 0-no | 1-yes |
| **BI** | 23 | | Inverter Connected | 0-no | 1-yes |
| **BI** | 24 | | Contactor K2S (only static switch > 800K)[6] | 0-open | 1-closed |
| **BI** | 25 | | Mains 2 Input Switch[4] | 0-open | 1-closed |
| **BI** | 26 | | Maintenance Bypass Sw[4] | 0-open | 1-closed |
| **BI** | 27 | | Q5N Inverter Output Sw | 0-open | 1-closed |
| **BI** | 28 | | Static Switch Status[4] | 0-open | 1-closed |
| **BI** | 29 | | Battery Installed[5] | 0-no | 1-yes |
| **BI** | 30 | | Battery Temperature Sensor Installed[5] | 0-no | 1-yes |
| | 31 | | Inverter K3N Contactor | 0-open | 1-closed |
| ADI | 1 | | Inverter Type @200 | 0-Unitary<br>1-Parallel without Static Switch<br>2-Parallel with Static Switch<br>3-Static Switch Cubicle | |

1 Network Point Type
2 Network Point Address
4 Not available for Parallel UPS.
5 Not available for Static Switch UPS.
6 Only available for Static Switch UPS.

### *Comet UPS Points*

*To get the hardware reference for mapping points to a CS object (via the software model), combine the NPT (Network Point Type) and NPA (Network Point Address). For example, the hardware reference for the Current Phase 3 Mains 2 point is AI6.*

**Table 4: EPS-3000/Comet UPS**

| NPT[1] | NPA[2] | Unit | Description |
|---|---|---|---|
| **AI** | 1 | A | Current Phase 1 Inverter |
| **AI** | 2 | A | Current Phase 2 Inverter |
| **AI** | 3 | A | Current Phase 3 Inverter |
| **AI** | 4 | A | Current Phase 1 Mains 2 |
| **AI** | 5 | A | Current Phase 2 Mains 2 |
| **AI** | 6 | A | Current Phase 3 Mains 2 |
| **AI** | 7 | A | Current Phase 1 Load |
| **AI** | 8 | A | Current Phase 2 Load |
| **AI** | 9 | A | Current Phase 3 Load |
| **AI** | 10 | V | U Mains 1 |
| **AI** | 11 | V | V1 Inverter |
| **AI** | 12 | V | V2 Inverter |
| **AI** | 13 | V | V3 Inverter |
| **AI** | 14 | V | U Mains 2 |
| **AI** | 15 | V | V1 Load |
| **AI** | 16 | V | V2 Load |
| **AI** | 17 | V | V3 Load |
| **AI** | 18 | kVA | S Apparent Power |
| **AI** | 19 | | % Load |
| **AI** | 20 | | % Rated Load |
| **AI** | 21 | Hz | Frequency Inverter |
| **AI** | 22 | Hz | Frequency Mains 2 |
| **AI** | 23 | Hz | Frequency Load |
| **AI** | 24 | # | Number of Times on Battery Power |
| **AI** | 25 | V | U Battery |
| **AI** | 26 | Min | Battery Backup Time |

1 Network Point Type
2 Network Point Address

**Continued on next page . . .**

| NPT[1] (Cont.) | NPA[2] | Unit | Description | | |
|---|---|---|---|---|---|
| **BI** | 1 | | Mains 1 Voltage | 0-normal | 1-alarm |
| **BI** | 2 | | Chopper Operation | 0-off | 1-on |
| **BI** | 3 | | Battery Circuit | 0-normal | 1-alarm |
| **BI** | 4 | | End of Battery Time | 0-no | 1-yes |
| **BI** | 5 | | Charger Status | 0-normal | 1-alarm |
| **BI** | 6 | | Check Battery | 0-normal | 1-alarm |
| **BI** | 7 | | Low Battery Shutdown Warning | 0-normal | 1-alarm |
| **BI** | 8 | | Charger Operating Status | 0-off | 1-on |
| **BI** | 9 | | Peak Overload | 0-no | 1-alarm |
| **BI** | 10 | | Inverter Overload | 0-no | 1-alarm |
| **BI** | 11 | | Inverter Operating Status | 0-off | 1-on |
| **BI** | 12 | | Inverter Thermal Overload | 0-normal | 1-alarm |
| **BI** | 13 | | K3N Contactor Status | 0-open | 1-closed |
| **BI** | 14 | | Inverter Connected | 0-no | 1-yes |
| **BI** | 15 | | Mains 2 Voltage | 0-normal | 1-alarm |
| **BI** | 16 | | Mains 2 Frequency | 0-normal | 1-alarm |
| **BI** | 17 | | Mains 2/Inverter Phase Shift | 0-normal | 1-alarm |
| **BI** | 18 | | Phase Rotation | 0-normal | 1-alarm |
| **BI** | 19 | | Mains 2 Overload | 0-normal | 1-alarm |
| **BI** | 20 | | Mains 2 Thermal Overload | 0-normal | 1-alarm |
| **BI** | 21 | | Normal | 0-no | 1-yes |
| **BI** | 22 | | Danger | 0-no | 1-alarm |
| **BI** | 23 | | Downgraded | 0-no | 1-alarm |
| **BI** | 24 | | Low Battery Shutdown Warning | 0-no | 1-alarm |
| **BI** | 25 | | End of Battery Time | 0-no | 1-yes |
| **BI** | 26 | | Operating on Battery | 0-no | 1-yes |
| **BI** | 27 | | Battery Valid Indicator | 0-no | 1-yes |

1 Network Point Type
2 Network Point Address

# Metasys Network Setup

Metasys Network setup is described in the Metasys Integrator technical bulletins. This section contains details specific to MGE UPS Systems applications.

### *Mapping to a CS Object*

**Table 5: Software Model and CS Object Definition**

| **Application** | **Software Model** (on *Tables and Models* CD-ROM) | **Display Attribute** (recommended) | **NT Command Attribute** (recommended) |
|---|---|---|---|
| **Unitary** | MGEUPS_U.DDL | AI1 | AI1 |
| **Parallel** | MGEUPS_P.DDL | AI1 | AI1 |
| **Static Switch** | MGEUPS_S.DDL | AI1 | AI1 |
| **Comet** | MGECOMET.DDL | AI1 | AI1 |

* For the NT Command attribute, use the same attribute as the Display attribute. However, since the points are not commandable, you will not be able to command the attribute. (This must be defined because the NT Command attribute cannot be null.)

# Custom Integration

For information on integrating products that are not discussed in this document, first refer to the *Metasys Compatible Global Catalog*, an online list of released Connectivity products. If this list does not provide the information you require, consider using the *System Integration Project Data Sheet* to request a custom contract from the System Integration Team.

Both the *Metasys Compatible Global Catalog* and the *System Integration Project Data Sheet* can be accessed from *The Advisor* by performing the following steps:

1. Click on the Systems Products button located on the left side of *The Advisor* home page.
2. Click on the *Product Literature* link.
3. Click on the *Manuals-FANS* link.
4. Click on the *629.0 Metasys Connectivity Sales Resource Manual* link.
5. Find the *System Integration Project Data Sheet* link in the Table of Contents. Click on this link to view an online copy of the *System Integration Project Data Sheet*, or click on the *Metasys Compatible Global Catalog* link below it to view a list of released Connectivity products.

The *System Integration Project Data Sheet (LIT-6290052)* can also be found in the *Metasys Connectivity Sales Resource Manual (FAN 629)*.

If you need further assistance, contact the Johnson Controls Field Support Center.

# Notes

JOHNSON CONTROLS

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507 E. Michigan Street
P.O. Box 423
Milwaukee, WI 53201

**www.johnsoncontrols.com**
**FAN 629.5**
Metasys Connectivity Technical Manual
Metasys Integrator Release 9.0
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